# A SPECTRAL DIFFERENCE BETWEEN SILICATES IN COMET HALLEY AND INTERSTELLAR SILICATES

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We have obtained an intermediate resolution (1%) spectrum of the 8 to 13 μm region in Comet Halley which shows a prominent silicate emission feature with structure not observed before in other comets or in interstellar silicates (Figure 1). We confirm the presence of a strong 11.3 μm peak reported by Bregman et al. (1987) and find evidence for additional structure in the band. The 11.3 μm peak represents the main difference between the Halley Spectrum and that of Comet Kohoutek (Merrill 1974, Figure 2). The Kohoutek Spectrum is similar to that of the circumstellar shell around μ Ceph.

Based on a comparison with the spectra of Interplanetary Dust Particles (Sandford & Walker 1985, Figure 3), most of which are believed to be of cometary origin, we attribute the 11.3 μm peak to small crystalline olivine particles, although other minerals cannot be ruled out. Our interpretation is supported by the airborne observation of four emission peaks near 24, 28, 35 and 45 μm which can also be matched with iron-magnesium silicates including crystalline olivine. Other types of silicates (such as hydrated or amorphous) are necessary to explain the width and the 9.7 μm peak of the emission observed in Comet Halley. A complete discussion of this work has been submitted to the Astrophysical Journal.

## REFERENCES

Bregman, J.D. et al.: 1987, Astron. Astrophys. 187, 616.

Merrill, K.M.: 1974, Icarus 23, 566.

Sandford, S.A. and Walker, R.M.: 1985, Astrophys. J. 291, 838.

FIGURE 1. The 8 to 12.9 μm spectrum of Comet Halley taken on 1986 January 16.08 UT using NASA's IRTF in Hawaii. The error bars are shown only when larger than the symbols. A 385K blackbody continuum has been fit to the first and last points and is represented by the solid line.

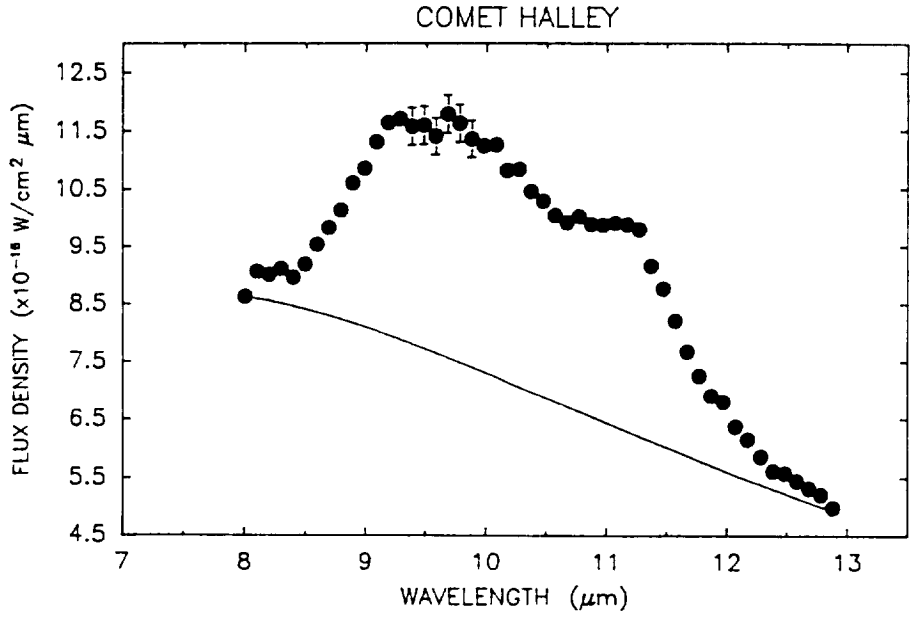
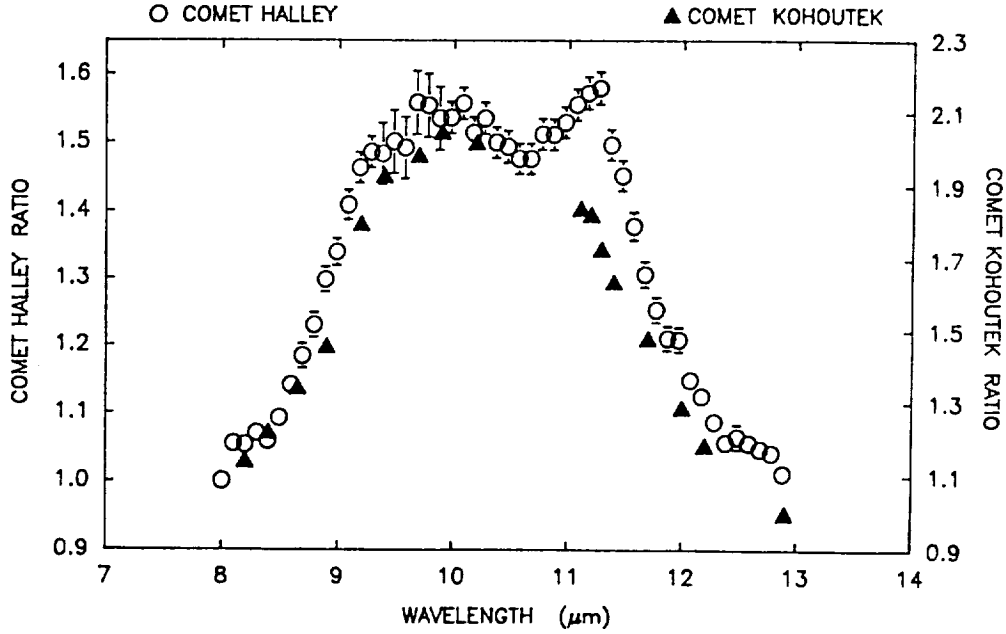



FIGURE 2. The "true" shape of the Comet Halley emission feature is shown (open circles) after dividing by the continuum in Figure 1. The Spectrum of Comet Kohoutek after dividing by a 600K continuum (Merrill 1974) is also shown (filled triangles) to illustrate the difference.



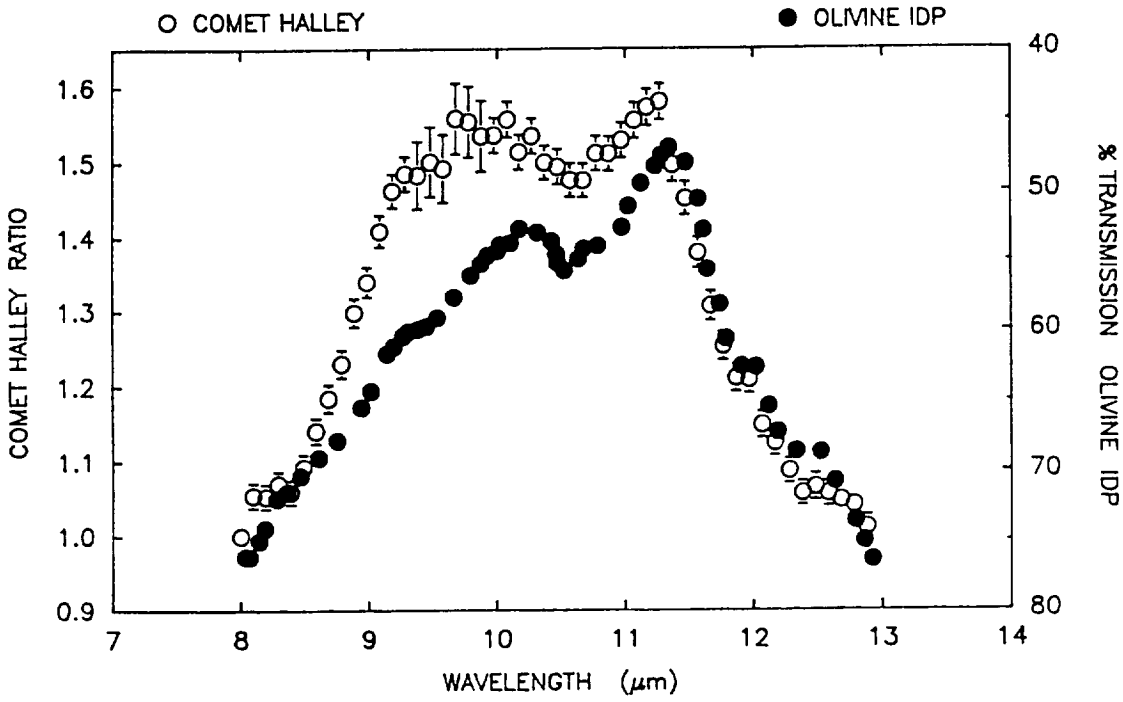



FIGURE 3. A comparison of our Comet Halley spectrum from Figure 2 (open circles) with the transmission spectrum (inverted) of the "Jedai" IDP (filled circles) from Sandford and Walker (1985). The spectrum of this particle is typical of those in the "olivine" spectral class. Note the correspondence between the two spectra longward of 10 μm.